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WE CLAIM:

1. A method of selecting an optimal set of antennas from a plurality of antennas for use by a transmitter and/or receiver having a plurality of RF chains to transmit and/or receive a wireless signal on a wireless link or network, said method comprising the steps of:

determining information concerning transmission of wireless signals on said wireless link;

selecting an optimal set of antennas from said plurality of antennas based on said information; and

connecting said RF chains to said optimal set of antennas to permit transmission and/or reception of said wireless signal on said wireless link via said optimal set of antennas,

wherein said RF chains correspond in number to the number of antennas in said optimal set of antennas, and the number of antennas included in said plurality of antennas is greater than the number of RF chains.

2. A method according to claim 1, wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

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3. A method according to claim 1, wherein said determining step is performed at a receiver.

4. A method according to claim 1, wherein said determining step is performed at said transmitter.

5. A transmitter comprising:

a plurality of antennas;

a plurality of RF chains, each RF chain transmits a wireless signal on a wireless link to a receiver via one of said plurality of antennas; and

an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said RF chains to transmit said wireless signal on said wireless link,

wherein said antenna selection apparatus determines information concerning transmission of wireless signals on said wireless link, selects an optimal set of antennas from said plurality of antennas based on said information, and connects said RF chains to said optimal set of antennas to permit transmission of said wireless signal from said RF chains on said wireless link via said optimal set of antennas, and

wherein said RF chains correspond in number to the number of antennas in said optimal set of antennas, and the number of antennas included in said plurality of antennas is greater than the number of RF chains.

*(6)* A transmitter according to claim 5, wherein said receiver includes a plurality of antennas.

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7. A transmitter according to claim 5, wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

8. A transmitter according to claim 5, wherein said information received by said antenna selection apparatus is determined at said transmitter.

9. A transmitter comprising:  
    a plurality of antennas;  
    a plurality of RF chains, each amplifier transmits a wireless signal on a wireless link to a receiver via one of said plurality of antennas; and  
    an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said RF chains to transmit said wireless signal on said wireless link,

    wherein said antenna selection apparatus receives information concerning transmission of wireless signals on said wireless link, selects an optimal set of antennas from said plurality of antennas based on said information, and

connects said RF chains to said optimal set of antennas to permit transmission of said wireless signal from said RF chains on said wireless link via said optimal set of antennas, and

wherein said RF chains correspond in number to the number of antennas in said optimal set of antennas, and the number of antennas included in said plurality of antennas is greater than the number of RF chains.

(10). A transmitter according to claim 9, wherein said receiver includes a plurality of antennas.

11. A transmitter according to claim 9, wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

(12). A transmitter according to claim 9, wherein said information received by said antenna selection apparatus is determined at said receiver.

13. A receiver comprising:  
a plurality of antennas;  
a plurality of receive radio frequency (RF) chains, each receive RF chain receives a wireless signal on

a wireless link from a transmitter via one of said plurality of antennas; and

an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said receive RF chains to receive said wireless signal on said wireless link,

wherein said antenna selection apparatus determines information concerning receiving of wireless signals on said wireless link, selects an optimal set of antennas from said plurality of antennas based on said information, and connects said receive RF chains to said optimal set of antennas to permit receipt of said wireless signal from said receive RF chains on said wireless link, and

wherein said receive RF chains correspond in number to the number of antennas in said optimal set of antennas, and the number of antennas included in said plurality of antennas is greater than the number of said receive RF chains.

(14) A receiver according to claim 13, wherein said transmitter includes a plurality of antennas.

15. A receiver according to claim 13, wherein said information is used to optimize said wireless link according to criterion including any one of capacity,

diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

16. A receiver according to claim 13, wherein said information received by said antenna selection apparatus is determined at said receiver.

17. A receiver comprising:

- a plurality of antennas;
- a plurality of receive radio frequency (RF) chains, each receive RF chain receives a wireless signal on a wireless link from a transmitter via one of said plurality of antennas; and
- an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said receive RF chains to receive said wireless signal on said wireless link,
- wherein said antenna selection apparatus receives information concerning transmission of wireless signals on said wireless link, selects an optimal set of antennas from said plurality of antennas based on said information, and connects said receive RF chains to said optimal set of antennas to permit receipt of said wireless signal from said receive RF chains on said wireless, and
- wherein said receive RF chains correspond in number to the number of antennas in said optimal set of

antennas, and the number of antennas included in said plurality of antennas is greater than the number of said receive RF chains.

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(18) A receiver according to claim 16,<sup>17</sup> wherein said transmitter includes a plurality of antennas.

19. A receiver according to claim 16,<sup>17</sup> wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

(20) A receiver according to claim 9,<sup>17</sup> wherein said information received by said antenna selection apparatus is determined at said transmitter.

21. A transmitter comprising:  
a plurality of antennas;  
a plurality of RF chains, each RF chain transmits a wireless signal on a wireless link to a receiver via one of said plurality of antennas; and  
an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said RF chains to transmit said wireless signal on said wireless link,

wherein said antenna selection apparatus determines information concerning transmission of wireless signals on said wireless link, determines an optimal number of antennas based on said information, selects an optimal set of antennas from said plurality of antennas according to said optimal number of antennas determined based on said information, and connects said RF chains to said optimal set of antennas to permit transmission of said wireless signal from said RF chains on said wireless link via said optimal set of antennas, and

wherein said RF chains correspond to a number at least equal to a highest possible optimal number of antennas to be determined based on said information, and the number of antennas included in said plurality of antennas is greater than the number of RF chains.

(22) A transmitter according to claim 23, wherein said receiver includes a plurality of antennas.

23. A transmitter according to claim 23, wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.

24. A transmitter comprising:  
a plurality of antennas;

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a plurality of RF chains, each RF chain transmits a wireless signal on a wireless link to a receiver via one of said plurality of antennas; and

an antenna selection apparatus which selects an optimal set of antennas from said plurality of antennas for use by said RF chains to transmit said wireless signal on said wireless link,

wherein said antenna selection apparatus receives information concerning transmission of wireless signals on said wireless link, determines an optimal number of antennas based on said information, selects an optimal set of antennas from said plurality of antennas according to said optimal number of antennas determined based on said information, and connects said RF chains to said optimal set of antennas to permit transmission of said wireless signal from said RF chains on said wireless link via said optimal set of antennas, and

wherein said RF chains correspond to a number at least equal to a highest possible optimal number of antennas to be determined based on said information, and the number of antennas included in said plurality of antennas is greater than the number of RF chains.

25. A transmitter according to claim 26, wherein said receiver includes a plurality of antennas.

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26. A transmitter according to claim 26, wherein said information is used to optimize said wireless link according to criterion including any one of capacity, diversity, spatial multiplexing and any other criterion for which the wireless link is to be optimized.